Muscle Snatch as an Indicator of Readiness in Weightlifters

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Abstract

This study looked to determine the relationship between vertical jump height and the muscle snatch as a marker of readiness in male and female weightlifters. The sport of weightlifting depends on leg and hip strength for generating large ground reaction forces in a short time frame. Vertical jumps are biomechanically similar to weightlifting movements, making it a beneficial alternative to having athletes regularly perform 1RM max in training. The dynamic multi joint performance of the static, countermovement, and depth jump can be used to monitor and evaluate readiness in male and female weightlifters.

Introduction

Previous research has indicated the vertical jump is an indicator of readiness in male and female weightlifters.[1] These tests have been used chronically to monitor performance and are proxy measures for strength and power of the lower body musculature.[2] The sport of weightlifting depends on lower body strength and power as a determinate for performance and coaches search for ways to track performance without disrupting training. Testing maximal abilities is not always possible due to the risk of injury and associated fatigue that accompanies this testing. Therefore, this study is attempting to correlate the muscle snatch exercise with vertical jumps to infer readiness to train in weightlifters. Specifically, this study is investigating various performance measures in the vertical jumps against the speed of the muscle snatch (MS) exercise.

Attention Grabbing Question ?

Is the muscle snatch efficacious for predicting power, jumping ability, and performance in trained weightlifters?

PARTICIPANTS

Four participants (3F, 1M; 32.0 ± 2.9years, 172.2 ± 2.7cm, 88.1 ± 15.3 kg, 9.2 ± 2.7 training age) completed this study. Subjects needed to be well-trained weightlifters actively competing in the sport of weightlifting, familiar with the MS exercise, and able to perform vertical jumps. Subjects would be excluded if they had an injury in the past 3 months, could not complete vertical jumps, or did not regularly use the MS exercise.

METHODS

Subjects completed this study over seven weeks in which they completed experimental trials, either once or twice a week, based on their training program. In total, 28 individual sessions were used for analysis. Prior to each training session subject would complete a general dynamic warm up for 5-10 minutes of upper and lower body exercises. Following this period, subjects will complete two warm-up vertical jumps at 50% and 75% of their perceived maximal effort. Next, subjects completed two maximal jumps in three different modes of static, countermovement, and drop jumps each separated by one minute of passive rest. All jumps were performed on dual force plates sampling at 1000hz for measurement of performance metrics. After the vertical jumps, subjects then began the MS testing. Subjects completed a warm-up with the empty bar for five repetitions, three repetitions at 30% of their max followed by three maximal attempts at 50% of their max for analysis. All MS data was collected with a linear position transducer sampling at 200hz. Vertical jump height (JH), peak power (PP), and reactive strength (RSImod, RSI) were obtained from the force plates and peak velocity and peak power were obtained from the linear position transducer. Data was assessed for normality using a Shapiro-Wilks test. A series of Pearson product moment correlations were conducted to asses the relationship between different vertical jumps and muscle snatch performance.

RESULTS

All data was normally distributed. Data for correlations between static, countermovement, and depth jumps with the MS can be found in table 1.

Table 1. Vertical Jump & Muscle Snatch Correlations

	MS Peak Velocity		MS Peak Power	
	r	*p*	*r*	*p*
SJ H	0.164	0.27	0.478	0.01
SJ PP	0.533	0.004*	0.731	<0.001†
CMJ H	0.271	0.163	0.514	0.005*
CMJ PP	0.476	0.01	0.693	<0.001†
CMJ RSImod	0.562	0.002*	0.739	<0.001†
DJ H	0.495	0.007*	0.663	<0.001†
DJPP	0.646	<0.001†	0.797	<0.001†
DJ RSI	0.078	0.692	-0.101	0.607

Note: SJ=static Jump; CMJ=countermovemnt Jump; DJ=depth jump

DISCUSSION

This study demonstrated that the peak velocity and the peak power in the MS exercise are correlated with the static, countermovement, and depth jumps performance. Earlier research identified vertical jumping as an important measure of readiness of weightlifters and is used in conjunction with the normal training process.[1] This study found that the MS exercise was moderately to strongly correlated with all three vertical jump types. This indicates that monitoring the peak velocity and peak power of the MS may provide valuable information about the current status of a trained weightlifter before a training session. The muscle snatch exercise, when done with the loads experienced in this study, is a low-fatigue high-skill movement that is familiar to many weightlifters. Because the MS can be implemented quickly and does not interrupt normal training, it serves as a valuable tool for monitoring weightlifters over time.

TAKE HOME MESSAGES

The muscle snatch exercise can be used as a marker of readiness in trained weightlifters. Because of the ease of use and low fatigue associated with using the muscle snatch pre training this test can be implemented alongside a training plan with minimal disruption of training. Coaches can use this test to help inform the training process and can be used to monitor and test an athlete's current fatigue, thus allowing for adjustment of an acute training session.

REFERENCES

1. Travis, S. K., Goodin, J. R., Beckham, G. K., & Bazyler, C. D. (2018). Identifying a test to monitor weightlifting performance in competitive male and female weightlifters. Sports, 6(2), 46.
2. Travis, S. K. (2018). Preparing for a national weightlifting championship: A case series (Doctoral dissertation, East Tennessee State University).